American Water Works Association

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ANSI/AWWA C750-16
(Revision of ANSI/AWWA C750-10)

AWWA Standard

Transit-Time Flowmeters in Full Closed Conduits

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AWWA Standard

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Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C710.*

I. Introduction.

I.A. *Background.* The first water meter that was produced in the United States is thought to be a positive displacement meter that was fabricated in 1857. Since then, a number of other technologies and designs have been introduced to the water industry, each with its special characteristics. The ultrasonic flowmeter is one of the latest additions to the industry. The use of ultrasonic flowmeters has received wide commercial acceptance since the 1970s. There are currently two distinct types of ultrasonic flowmeters available: Doppler-effect and transit-time. While the Doppler-effect meter is used extensively for water and other liquids containing solid particles, the transit-time ultrasonic flowmeter is receiving increased acceptance in the water industry.

I.B. *History.* In 1985, the American Society of Mechanical Engineers (ASME)† published the first standard for the transit-time ultrasonic (transit-time) flowmeters. The needs of the water industry differ, in some respects, from other industries, therefore necessitating the development of an AWWA standard for transit-time flowmeters.

In 1990, the AWWA Standards Committee on Rate Type Flowmeters was formed to develop standards for transit-time meters. The Subcommittee on Ultrasonic Meters was later developed for this purpose. The subcommittee prepared a first draft of the transit-time flowmeter standard in 1992. The first draft was reviewed and commented on by the subcommittee members as well as members of the Rate Type Flowmeter Committee. Subsequent drafts were sent out to a number of transit-time flowmeter manufacturers in 1994 for their review and comments. A 1995 draft addressed these comments, where possible, and was distributed to all who had previously commented on the drafts. A revised draft was presented to the subcommittee in 1995. The subcommittee met in January 1996 to finalize the standard. However, the subcommittee decided that leaving the draft open to the general public for review and comment, prior to finalizing the standard, would produce a more thorough standard. *Journal AWWA* was considered a suitable medium for reaching the water industry. The subcommittee changed the format of the standard into a *Journal AWWA* article that was published in the July 1997 edition of *Journal AWWA* as a Committee Report. The article encouraged

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
† American Society of Mechanical Engineers, 2 Park Avenue, New York, NY 10016-5990.

the public to comment on the contents of the Committee Report. A few written comments were received and were addressed in developing the final draft of the standard. On Jan. 19, 2003, the standard was approved by the AWWA Board of Directors. The second edition of ANSI/AWWA C750 was approved on Jan. 17, 2010, and this edition of the standard was approved on Jan. 16, 2016.

I.C. *Acceptance.* In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSF) to develop voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. Other members of the original consortium included the Water Research Foundation (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (AWWA) and the Association of State Drinking Water Administrators (ASDWA) joined later.

In the United States, authority to regulate products for use in, or in contact with, drinking water rests with individual states.* Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local agencies may use various references, including

1. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.
2. Specific policies of the state or local agency.
3. Two standards developed under the direction of NSF†: NSF/ANSI‡ 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.
4. Other references, including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,§ and other standards considered appropriate by the state or local agency.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 61. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdictions. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

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* Persons outside the United States should contact the appropriate authority having jurisdiction.

† NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.

‡ American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

§ Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

Annex A, "Toxicology Review and Evaluation Procedures," to NSF/ANSI 61 does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

In an alternative approach to inadvertent drinking water additives, some jurisdictions (including California, Louisiana, Maryland, and Vermont, for example) have called for reduced lead limits for materials in contact with potable water. Various third-party certifiers have been assessing products against these lead content criteria, and a new ANSI-approved national standard, NSF/ANSI 372, Drinking Water System Components—Lead Content, was published in 2010.

On Jan. 4, 2011, legislation was signed revising the definition for "lead free" within the Safe Drinking Water Act (SDWA) as it pertains to "pipe, pipe fittings, plumbing fittings, and fixtures." The changes went into effect on Jan. 4, 2014. In brief, the new provisions to the SDWA require that these products meet a weighted average lead content of not more than 0.25 percent.

ANSI/AWWA C750 does not address additives requirements. Users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.
2. Determine the status of certifications by parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues. This standard is different in format from other AWWA standards that contain specific requirements for material, dimensions, workmanship, and other physical requirements. Different transit-time flowmeters employ different materials and technologies. The software and the electronic components of transit-time flowmeters are generally designed to work with the physical characteristics of each make of the equipment.

II.A. *Chlorine and Chloramine Degradation of Elastomers.* The selection of materials is critical for water service and distribution piping in locations where there is a possibility that elastomers will be in contact with chlorine or chloramines. Documented research has shown that elastomers such as gaskets, seals, valve seats, and encapsulations may be degraded when exposed to chlorine or chloramines. The impact of degradation is a function of the type of elastomeric material, chemical concentration, contact surface area, elastomer cross section, and environmental conditions as well as temperature. Careful selection of and specifications for elastomeric materials and the specifics of their applications for each water system component should be considered to provide long-term usefulness and minimum degradation (swelling, loss of elasticity, or softening) of the elastomer specified.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* The following information should be provided by the purchaser (also refer to appendix A):

1. Standard used—that is, ANSI/AWWA C750, Transit-Time Flowmeters in Full Closed Conduits, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects; NSF/ANSI 372, Drinking Water System Components—Lead Content; or an alternative lead content criterion is required.
3. Details of other federal, state or provincial, and local requirements (Sec. 4.1).
4. Size of the conduit (Sec. 4.2).
5. Type of transducer (Sec. 4.3.2).
6. Single-path or multipath (Sec. 4.4).
7. Performance requirements (Sec. 4.5).
8. Required accuracy (Sec. 4.5.1).
9. Installation issues (Sec. 4.6.1.4).
10. Affidavit of compliance, if required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major revisions made to the standard in this edition include the following:

1. Information on reduced lead limits for materials in contact with drinking water has been added to the foreword, including the revision of the definition of "lead-free" in the Safe Drinking Water Act and NSF/ANSI 372, Drinking Water System Components—Lead Content (Sec. I.C and Sec. III.A).
2. Information on chlorine and chloramine degradation of elastomers has been added to the foreword (Sec. II.A).

V. Comments. If you have any comments or questions about this standard, please contact AWWA Engineering and Technical Services at 303.794.7711, FAX at 303.795.7603; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email at standards@awwa.org.

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SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes transit-time ultrasonic flowmeters for water supply service application in pipes running full. An ultrasonic flowmeter is a meter that uses acoustic energy signals to measure liquid velocity. There are currently two distinct types of ultrasonic flowmeters available: Doppler-effect and transit-time. The Doppler-effect meter is used exclusively for liquids containing solid particles or gases, and the transit-time flowmeter is used in a wide variety of applications in the water industry.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for transit-time flowmeters, including components, performance, calibration, and verification.

Sec. 1.3 Application

Transit-time flowmeters are used in a wide variety of applications, including in raw water, in treated water, and in different stages of the treatment process, such as settled water, supernatant, backwash, and chemical lines. These meters are also used in large-diameter transmission pipelines.